REMARKS/ARGUMENTS

Claims 1-33 are pending. Claims 1, 16, and 21 have been amended. New claims 31-36 have been added. The specification has been amended. Formal drawings are submitted. No new matter has been introduced. Applicants believe the claims comply with 35 U.S.C. § 112.

Applicants note with appreciation the indicated allowability of claims 13-15, 18-20, and 23-25 if rewritten in independent form. The claims have not been amended at this time because Applicants believe the claims are allowable as being dependent upon allowable independent claims.

Claims 1-10, 12, 16, 17, 21, 22, and 26-30 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Iwamoto et al. (US 5,521,036).

Applicants respectfully submit that independent claim 1 as amended is novel and patentable over Iwamoto et al. because, for instance, Iwamoto et al. does not teach or suggest dividing the substrate into a plurality of blocks; and for each block of the substrate, using the generated learning data of the one or more representative process regions of each block to control movement of the one or more stages to process the block of one or more process regions of the substrate.

Applicants respectfully submit that independent claim 16 as amended is novel and patentable over Iwamoto et al. because, for instance, Iwamoto et al. does not teach or suggest a substrate having a plurality of blocks; and a stage control module configured to use, for each block of the substrate, the generated learning data of the one or more representative process regions of each block to control movement of the one or more stages to process the block of one or more process regions of the substrate.

Applicants respectfully submit that independent claim 21 as amended is novel and patentable over Iwamoto et al. because, for instance, Iwamoto et al. does not teach or suggest a substrate having a plurality of blocks; and code for using, for each block of the substrate, the generated learning data of the one or more representative process regions of each block to control movement of the one or more stages to process the block of one or more process regions of the substrate.

The present invention relates to lithographic processing of a substrate, and particular embodiments involve feedforward and feedback control of the lithographic

processing system to improve throughput and accuracy. Specifically, as in one example, the substrate is divided into blocks or groups (604, 606, 608, 610, 612, 614, 616, 618, 620) of process regions which, for an exposure apparatus, are exposure shot regions as shown in Fig. 6 to improve processing accuracy:

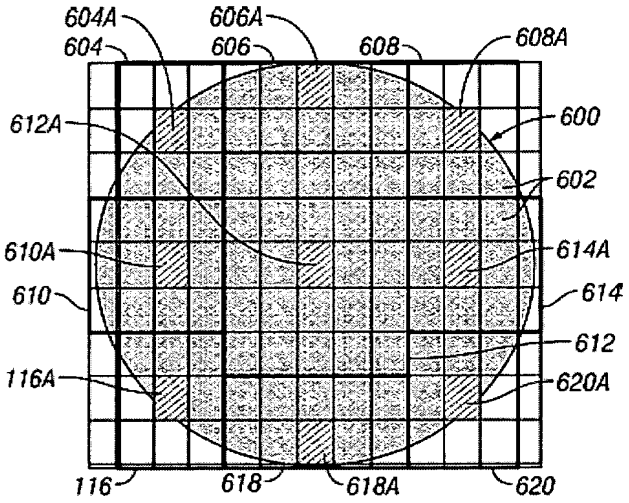
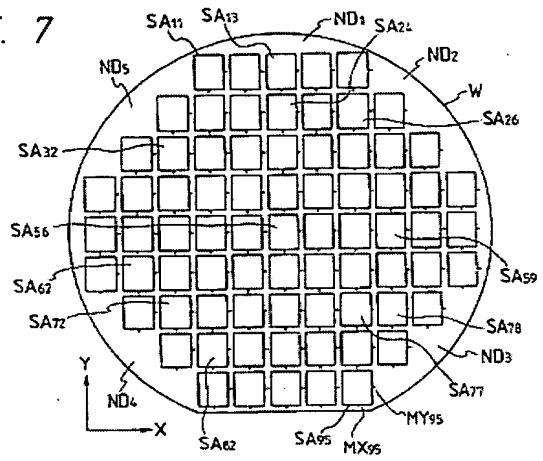


FIG. 6

Learning data is obtained from one or more representative process regions (or shot regions) within each block and used to control the stages to process the entire block of process regions. As discussed in paragraphs [0061]-[0064], dividing the substrate into a plurality of blocks reduces the learning time. The control for the remaining portion of each block is done by using the representative data from one or more representative process regions of the block.

In contrast, *Iwamoto fails to teach or suggest the division of the wafer into blocks, with each block including one or more shot regions.* In column 14, lines 52-61, Iwamoto does describe the use of shot regions to represent smaller areas of the wafer. As specifically described in column 14, "a plurality of circuit patterns (shot areas SA_{ij}) and wafer marks (MX_{ij}, MY_{ij}) have already been formed in matrix on the wafer W." Fig. 7 (shown below) further displays a distribution of shot areas and wafer marks upon a sample wafer. Iwamoto further describes the use of specific shot areas or sample shots to determine the array coordinate values of the shot areas on the wafer based on the alignment marks adjacent to the perimeter of each of the sample shots in column 13, lines 50-67.

FIG. 7



Iwamoto et al. merely determines the array coordinate values of the shot areas on the wafer based on the alignment marks adjacent to the perimeter of each of the sample shots. It does not teach or suggest dividing the wafer into blocks with each block including one or more shot regions. Clearly, Iwamoto et al. does not use generated learning data of one or more representative shot regions of each block to control movement of one or more stages to process the block.

The instant application discloses the division of the wafer into blocks to reduce the learning time and increase the accuracy of processing steps:

> The controller obtains the data of the center area of each block for use as representative data for the control of that block. The control for the remaining portion of the block is done by using the representative data of the block. **(¶[0062])**
>
> ***
>
> In some embodiments, the representative data is used for the control of the remaining portion of the block. ... That is, representative data obtained for the representative areas may be used to interpolate data beyond the representative areas. As a result, more continuous and suitable correction for the control of the entire operating range may be created from the representative data sets. (Emphasis added) **(¶[0063])**

In addition to being silent as to the grouping of shot regions into blocks, Iwamoto is similarly silent as to the grouping of shot regions into blocks based upon such parameters such as having similar stage position errors, center of gravity error compensation, similar force effects, or discontinuous blocks.

For at least the foregoing reasons, Applicants respectfully assert that independent claims 1, 16, and 21, and dependent claims 2-15, 17-20, and 22-30 are novel and patentable over Iwamoto et al.

New claims 31-33 depend from claims 1, 16, and 21, and further recite that the process regions are exposure shot regions. Support for this feature may be found in paragraph [0010] at page 4 of the specification. These features are also absent from Iwamoto et al. Therefore, claims 31-33 are patentable over Iwamoto et al.

New independent claims 34-36 recite that the movement of the stages to process a substrate having a plurality of process regions is performed using an iterative learning control. Support for this feature may be found in paragraph [0046] at page 11 of the specification. This feature is also absent from Iwamoto et al. Therefore, claims 34-36 are patentable over Iwamoto et al.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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Attachments
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Amendments to the Drawings:

The attached sheets of drawings include Figs. 1-15, and replace the original sheets including Figs. 1-15.

Attachment: Replacement Sheets